

Abstract Submitted  
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**Time Reversed Electromagnetics as a Novel Method for Wireless Power Transfer** ANU CHALLA, ECE Department, University of Maryland, STEVEN M. ANLAGE, Physics and ECE Departments, University of Maryland, TESLA TEAM<sup>1</sup> — Taking advantage of ray-chaotic enclosures, time reversal has been shown to securely transmit information via short-wavelength waves between two points, yielding noise at all other sites. In this presentation, we propose a method to adapt the signal-focusing technique to electromagnetic signals in order to transmit energy to portable devices. Relying only on the time-reversal invariance properties of waves, the technique is unencumbered by the inversely-proportional-to-distance path loss or precise orientation requirements of its predecessors, making it attractive for power transfer applications. We inject a short microwave pulse into a complex, wave-chaotic chamber and collect the resulting long time-domain signal at a designated transceiver. The signal is then time reversed and emitted from the collection site, collapsing as a time-reversed replica of the initial pulse at the injection site. When amplified, this reconstruction is robust, as measured through metrics of peak-to-peak voltage and energy transfer ratio. We experimentally demonstrate that time reversed collapse can be made on a moving target, and propose a way to selectively target devices through nonlinear time-reversal.

<sup>1</sup>University of Maryland Gemstone Team TESLA: Frank Cangialosi, Anu Challa, Tim Furman, Tyler Grover, Patrick Healey, Ben Philip, Brett Potter, Scott Roman, Andrew Simon, Liangcheng Tao, Alex Tabatabai

Anu Challa  
ECE Department, University of Maryland

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